March 26, 1946. F. N. REYNOLDS 2,397,371

LATHE CENTER

Filed April 10, 1944

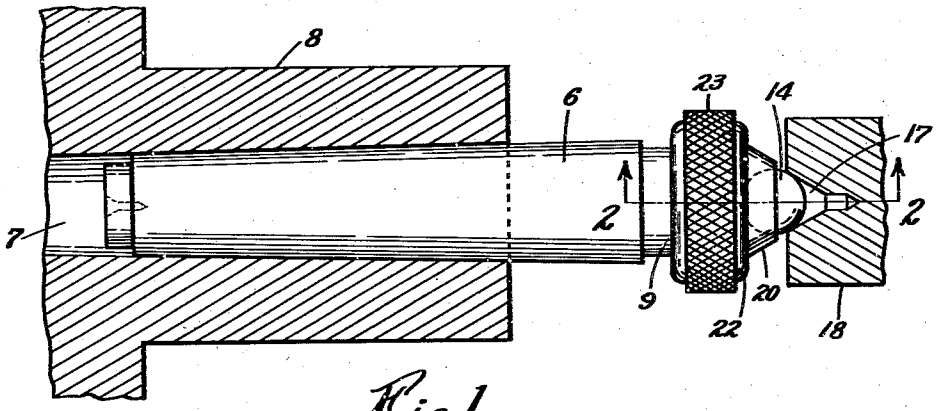


Fig. 1

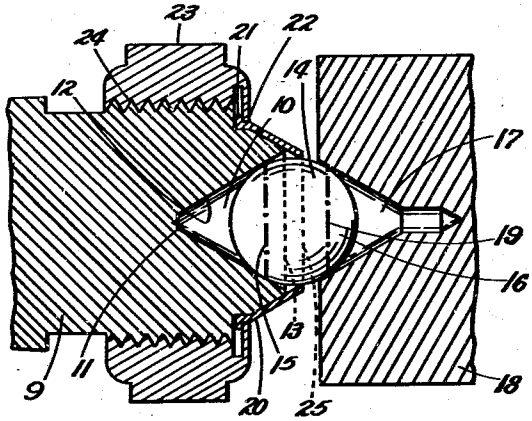


Fig. 2

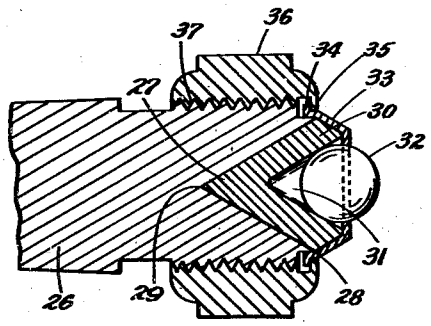


Fig. 3

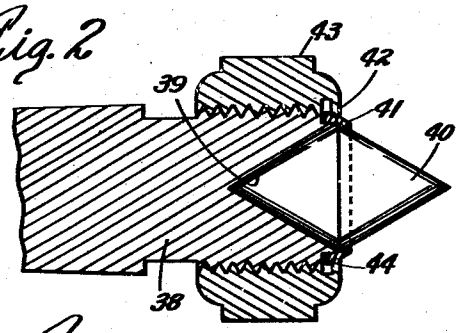


Fig. 4

INVENTOR.
Frederick N. Reynolds
BY
Murray, Strackhoff & Paddock
ATT'YS

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LATHE CENTER

Frederick N. Reynolds, Augusta, Ky.

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4 Claims. (Cl. 82—33)

The present invention relates to improvements in centering devices for lathes and is particularly directed to a center having a single seat formed therein which positively maintains a work engaging member at its dead center position and precludes radial displacement of said member in the seat.

An object of the invention is to provide a center of simplified construction having a work engaging member which under axial work clamping action of the lathe automatically centers itself relative to its supporting shank and the work, and which precludes all radial displacement between said member and the shank.

Another object of the invention is to provide a single ball center which is rotatably positioned in a conically shaped seat member mounted in the center shank, the ball being adapted to engage the seat about a small circle of its spherical surface lying in a plane at right angles to the axis of said shank.

A further object of the invention is to provide an improved attachment for preventing uneven wear in rotatable lathe centers to thereby insure an efficient and accurate device over a relatively long period of use, and to also provide an economical means for replacing the wearing part of the device.

Other objects and novel features will be apparent from the following specification and drawing which illustrate preferred embodiments of my invention, and in which:

Fig. 1 is a side elevational veiw of my lathe center, its cooperating tail stock and the work supported thereby being shown in central cross section.

Fig. 2 is an enlarged cross-sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a central cross-sectional view of a modified form of my center.

Fig. 4 is a central cross-sectional view showing another modification of my center.

My invention includes a tapered shank 6 which may be fitted in a tapered hole 7 formed in a conventional tail stock 8 of a lathe. This shank is provided with a head portion 9 which has formed therein a conically shaped seat 10 disposed coaxially with the longitudinal axis of the shank. As most clearly shown in Fig. 2, this seat has the shape of a right circular cone and its vertex 11 lies within the head and on the longitudinal axis of the shank, its lateral surface 12 converging outwardly from said vertex to the outer face 13 of the head, said face being disposed in a plane at right angles to said shank axis.

A spherical work engaging member 14 is positioned in the seat and is in contact with an intermediate portion of its lateral surface about a small circle 15, said circle lying in a plane at right angles to the axis of the shank.

When the member is in the above described position a major portion 16 of its surface extends beyond the face 13 of the shank. As shown in Figs. 1 and 2, this portion 16 is adapted to engage an intermedaite portion of a conventional, tapered recess 17 formed in the work 18, the spherical member being in contact with the work about a small circle 19 of its surface which lies in a plane at right angles to the axis of the shank or in a plane parallel to the plane of the small circle 15.

A means for retaining the member 14 in its seat when the tool is not in use comprises a cap 20 having the form of a frustum of a cone. This cap has a peripheral bead 21 in engagement with a flange 22 formed on a collar 23. The collar is removably held on the shank through cooperating threads 24. The outer portion of the cap is provided with a peripheral aperture 25 which freely engages a reduced portion of the spherical member 14 at a point beyond the plane of its center.

The seat 10 in the shank and the spherical member 14 are of hardened metal and the space between the vertex of the seat and the inner portion of the spherical member is filled with a suitable lubricant. The work 18 is of a relatively soft metal and upon rotation of said work the ball is adapted to rotate in its seat. During operation my center positively maintains the work on its true rotary axis due to the fact that the spherical member engages the work around a small circle 19 and engages the conical seat around a small circle 15, both circles being disposed at right angles to the common axis of the shank and the rotary axis of the work. Under operational work clamping pressure of the lathe the spherical member is confined in the conically shaped seat 10 and the conically shaped recess 17 formed in the work and due to the action of the opposed lateral surfaces the member 14 maintains the shank and the work in axial alignment. Furthermore, under prolonged usage the rotary spherical member tends to wear evenly in which event it merely seeks a dead center position in the seat which is removed inwardly from its initial position therein. The composite tool may be renewed by removing the nut and cap, inserting a new spherical member in the seat and replacing the cap and the nut. The spherical

member also precludes radial displacement between the work and the shank due to the fact that said member is positioned between two opposed conical recesses formed in the shank and in the work.

My invention includes the device shown in Fig. 3 wherein the shank 26 is provided with a conical recess 27 which is formed in the face 28 of the shank and disposed coaxially therewith. This recess receives the vertex portion 29 of a conically shaped member 30 having formed therein a conical seat 31 for receiving a spherical work engaging member 32. The member 32 is retained in the seat by means of a cap 33 which is provided at its inner end with a peripheral shoulder 34 which is engaged by a flange 35 formed on a nut 36. The nut is removably held on the shank by means of cooperating threads 37. This form of my invention is adapted to provide a tool for centering various types of work which have counter-sunk recesses of different diameters. The size of the spherical member 32 held in the shank 26 may be adjusted by interchanging the seat 30 for one of larger or smaller lateral area and inserting therein an appropriate spherical member. This modification would also require the use of various sized retainer caps having appropriate ball receiving apertures formed therein.

In Fig. 4 is shown another modified form of my invention wherein a shank 38 is provided with a conical seat 39 for receiving a work engaging member 40 which has the shape of two opposed right circular cones joined along their common base. This member is retained in its seat by a cap 41 which is removably positioned on the shank by cooperation of a flange 42 formed on a nut 43 threaded to the shank and a peripheral flange 44 formed on said cap. When the outer section of the member has become worn under prolonged contact with the rotating work supported thereby the member may be reversed end for end and the inner section may then be used as the work contacting portion.

What is claimed is:

1. In a lathe center the combination of a shank having a cone shaped hole formed therein, a cone shaped seat member removably positioned in the hole, a spherical member positioned in the seat and having a portion extending therefrom, and a cap removably mounted on the shank and adapted to retain said members in their operative positions on the shank.

2. In a lathe center the combination of a shank, a cylindrical head on the shank, a cone shaped recess formed in the head and disposed coaxially with the shank, a hollow cone shaped seat member removably positioned in the recess and having a tapered end extending beyond said recess, a spherical member removably positioned in the seat member, a cap engaging the tapered end of the seat member and the spherical member, and a cap retaining nut threaded to the head.

3. In a lathe center the combination of a shank, a recess formed in the shank end, a hollow cone shaped seat member in the recess, and having an end extending beyond the shank end, a ball positioned in the seat member, a seat member and ball engaging cap, and a cap retaining nut threaded to the head.

4. In a lathe center the combination of a shank, a cylindrical head on the shank, a cone shaped recess formed in the head and disposed coaxially with the shank, a hollow cone shaped seat member removably positioned in the recess and having a tapered end extending beyond said recess, a spherical member removably positioned in the seat member, a cap having the shape of a frustrum of a cone and engaging the tapered end of the seat member at its intermediate portion and having its reduced open end engaging the spherical member, a peripheral flange on the enlarged end of the cap, and cap retaining nut cooperating with the flange and threaded to the head.

FREDERICK N. REYNOLDS.